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The Honorable David Garman, Assistant Secretary
Office of Energy Efficiency & Renewable Energy
U.S. Department of Energy
Office of Building Technologies Program
1000 Independence Ave. SW
Washington, DC 20585

Re: Proposed Changes ENERGY STAR Ratings for Windows

Dear Assistant Secretary Garman,

I have studied the problem of energy conservation through window technology for 30 years. I no longer have any financial interest in the outcome of this rating program. However, I do have a strong belief in the value of the ENERGY STAR program to our country, and I want to see it done right. Thus I was most disappointed that only two non-optimal options were proposed for the ENERGY STAR rating system for windows. A much more energy-efficient solution would be obtained by the following proposal:

- 1) The most northerly zone should specify a minimum solar heat gain coefficient (SHGC). This minimum value could reasonably be set to about 0.5.
- 2) The middle zone or zones should specify a minimum solar heat gain coefficient. This minimum value could reasonably be set to about 0.4.
- 3) The most southern zone should specify a maximum solar heat gain coefficient. This maximum value could reasonably be set to about 0.4, as it is in both the current proposals.

Maximum U values would be specified as in the current DOE proposals.

The reasons for each of these specifications in our proposal follow:

- 1) No specification for solar heat gain was set for the most northern zone in either of DOE's proposals. This is a serious deficiency in these proposals, which limits their potential energy savings. Windows with the highest solar transmission minimize the large amount of energy used for heating in this northern zone. This conclusion is very clear from DOE's own analysis¹ that high-SHGC windows substantially reduce the heating load for houses in the northern region, compared to lower SHGC windows. The air conditioning load is small or non-existent in the northern zone, and cooling energy requirements in this zone can easily be minimized or eliminated by proper use of active window shading devices, such as blinds, drapes, deciduous trees or awnings, even for high-transmission windows. The most efficient windows in the northern zone are clearly the highest solar-transmission windows, and only these windows deserve the ENERGY STAR rating as the most energy-efficient choice in the northern region.
- 2) The central zone or zones are the most complicated to deal with, because significant amounts of energy are used both for heating and also for cooling. A higher SHGC is always more efficient in situations where active window-shading devices, such as blinds, drapes, deciduous trees or awnings, can be used effectively. In those few situations where architectural constraints limit the usefulness of active shading devices, a lower SHGC value of, say, 0.4 could be used to limit the air-conditioning load (although with an increased heating load.) For the central region(s) the DOE analysis is wrong and misleading because of its inadequate treatment of shading. The DOE analysis assumes that SHGC will be reduced by only 10%, from 80% in the winter to 70% during the summer cooling season when air conditioning is used. This small amount of seasonal adjustment is far below optimal. It is hard to see why anyone would bother to install such ineffective blinds, drapes, or awnings that would have only an additional 10% effect on SHGC. In addition to such a twice-yearly adjustment to window treatments, many occupants also choose to make daily adjustments, particularly in the spring and fall (such as opening eastern shades on a chilly morning or closing western shades on a hot afternoon). DOE's flawed model predicts a greater peak load reduction from low-transmission glazing. This prediction is wrong because occupants having a window with a higher SHGC (advantageous for winter heating) will naturally choose more effective active shading devices to lower the SHGC of their windows by a larger amount during the summer. Sensible occupants will make these adjustments not only to save energy, but also to

¹ See particularly Fig. 3 of the DOE document "An Evaluation of Alternative Qualifying Criteria for Energy Star Windows: February, 2003.

maintain comfort. (Who wants to sit in front of an unshaded window with glaring sunlight in a blast of cold air from an air conditioner?)

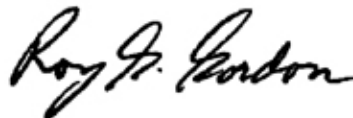
- 3) For the southern region, my proposal coincides with DOE's proposals.

I put forward my proposal in the sincere belief that it will serve the country better than either of the DOE proposals. Sometimes this debate has been framed as a competition between soft-coat technology and pyrolytic technology. I believe that this is the wrong way to frame the debate. Either technology is capable of achieving optimal energy savings. All of my suggested SHGC values can be attained by either soft-coat or pyrolytic technology. The higher SHGC value of 0.5 can be met by a single silver layer in a soft coat, or by the usual pyrolytic low-E products. The lower SHGC value of 0.4 can be met using a double silver layer soft-coat, or by using antimony-doped pyrolytic coatings.

Naturally, manufacturers would like to produce only one product for the whole US national market, in order to simplify their production and stocking. Unfortunately, this "one size fits all" approach exacts an enormous energy cost from consumers. What my proposal would do is force each of the two competing technologies to produce two different products, one optimized for northern climates, and a second for southern climates, in order to earn the ENERGY STAR rating in all regions of the US. Any company is of course free to produce only one version of its product, but it should not be rewarded by an ENERGY STAR rating for producing this limited, non-optimal product line for the entire US market. It should earn an ENERGY STAR rating only in those parts of the US in which its product is reasonably close to optimal.

If DOE decides that it is impractical to adopt my proposal right now, I would hope that they give it serious consideration for a future improvement of the ENERGY STAR program. Mr. Secretary, you have a duty to introduce better ENERGY STAR criteria that are based on sound science and the best available technology. The security of our country is at stake; every barrel of oil not saved by efficiency only prolongs our dependency on foreign sources, especially the Middle East.

Sincerely,



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